

FIGURE 6.1.3 RETURN LOSS OF ANTENNA PORT 3 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

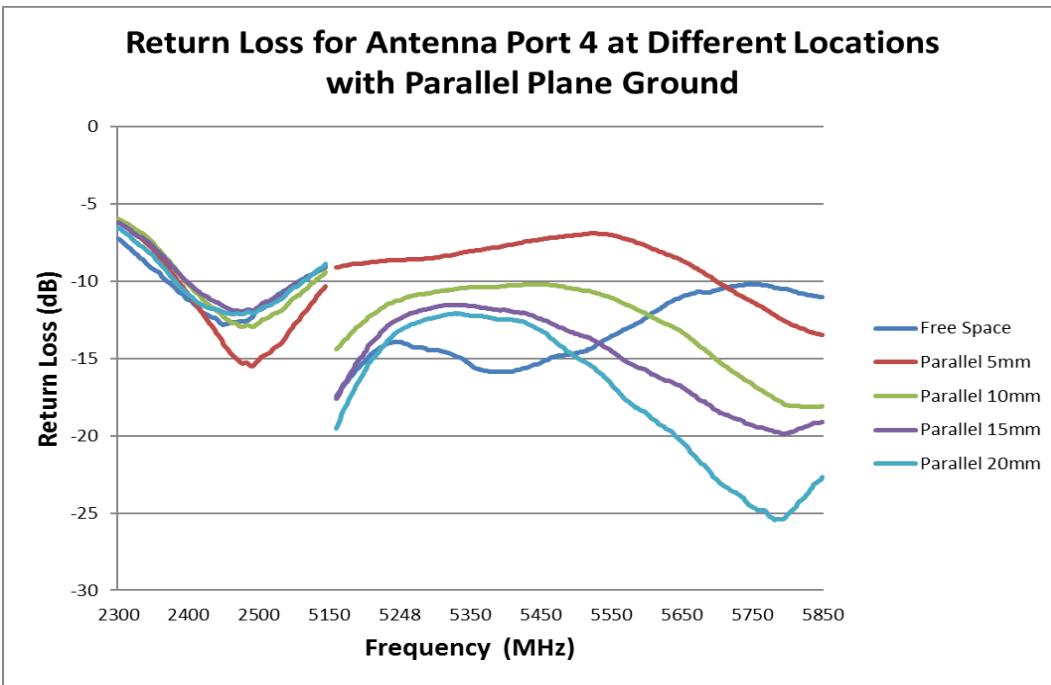


FIGURE 6.1.4 RETURN LOSS OF ANTENNA PORT 4 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

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B	EC No: 642299 DATE: 2020/07/15	WiFi 6E Flex Cabled 4x4 MIMO Antenna Application Specification	47 of 65
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
AS-2123300100	Liu Hai 2020/07/07	Kang Cheng 2020/07/07	Andy Zhang 2020/07/07

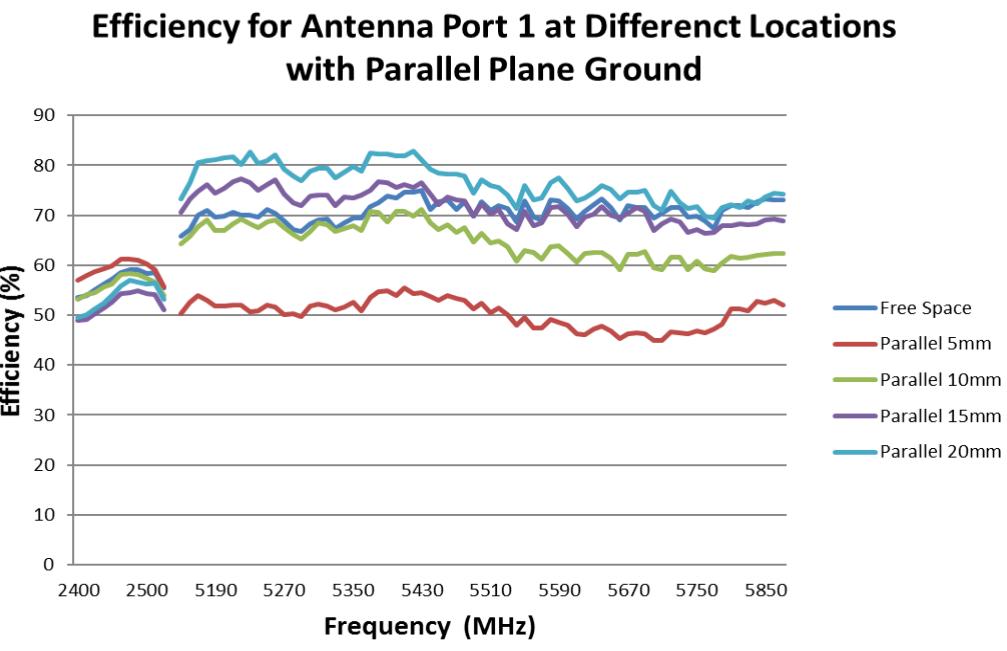


FIGURE 6.1.5 EFFICIENCY OF ANTENNA PORT 1 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

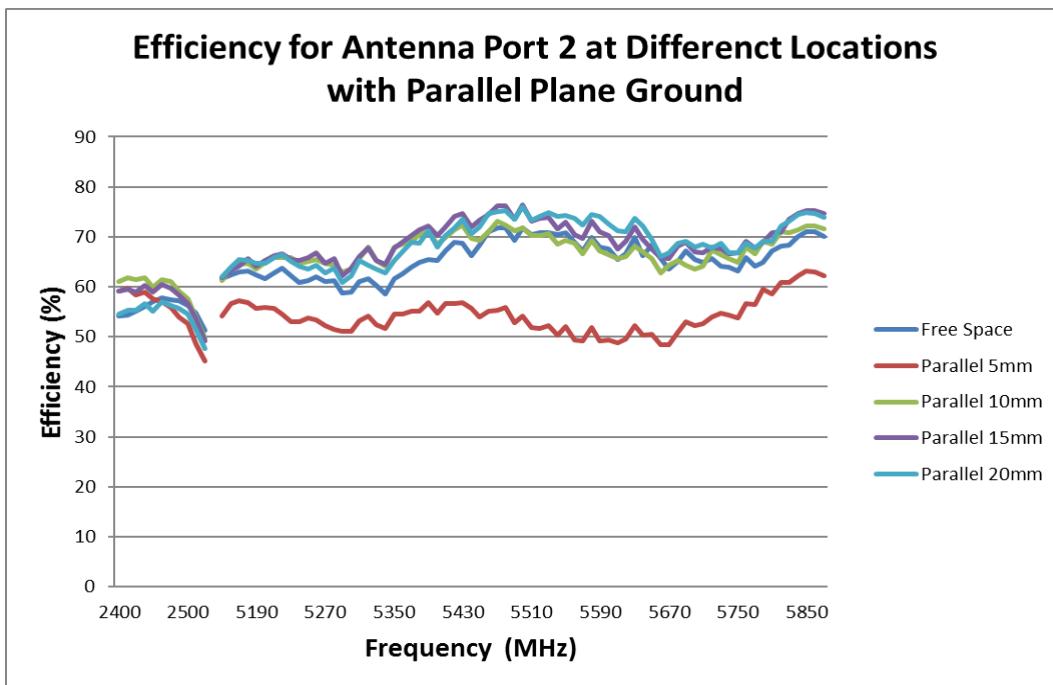


FIGURE 6.1.6 EFFICIENCY OF ANTENNA PORT 2 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

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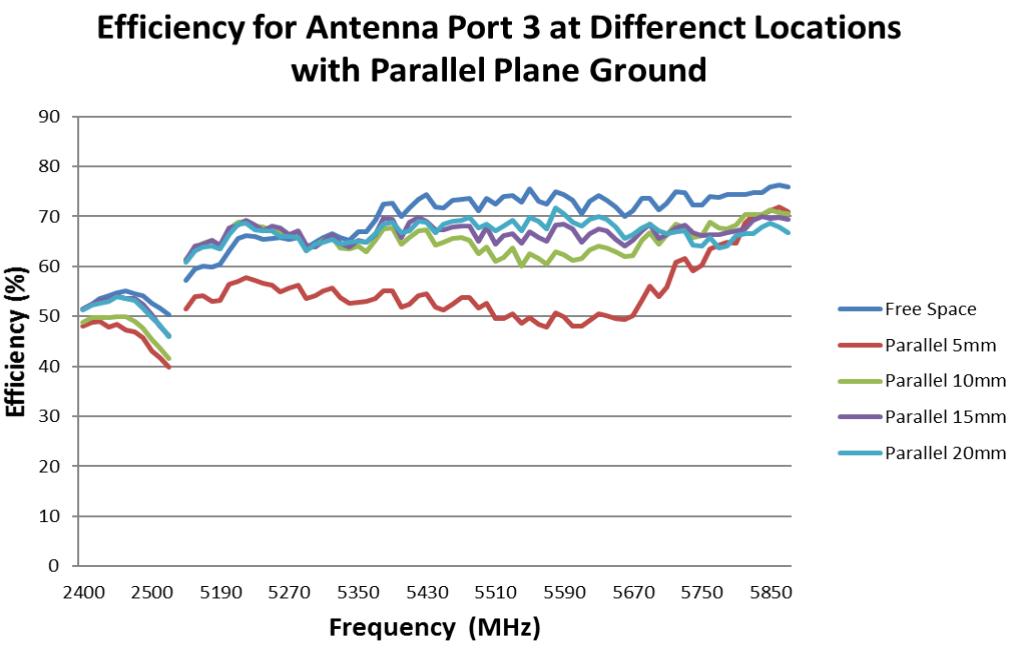


FIGURE 6.1.7 EFFICIENCY OF ANTENNA PORT 3 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

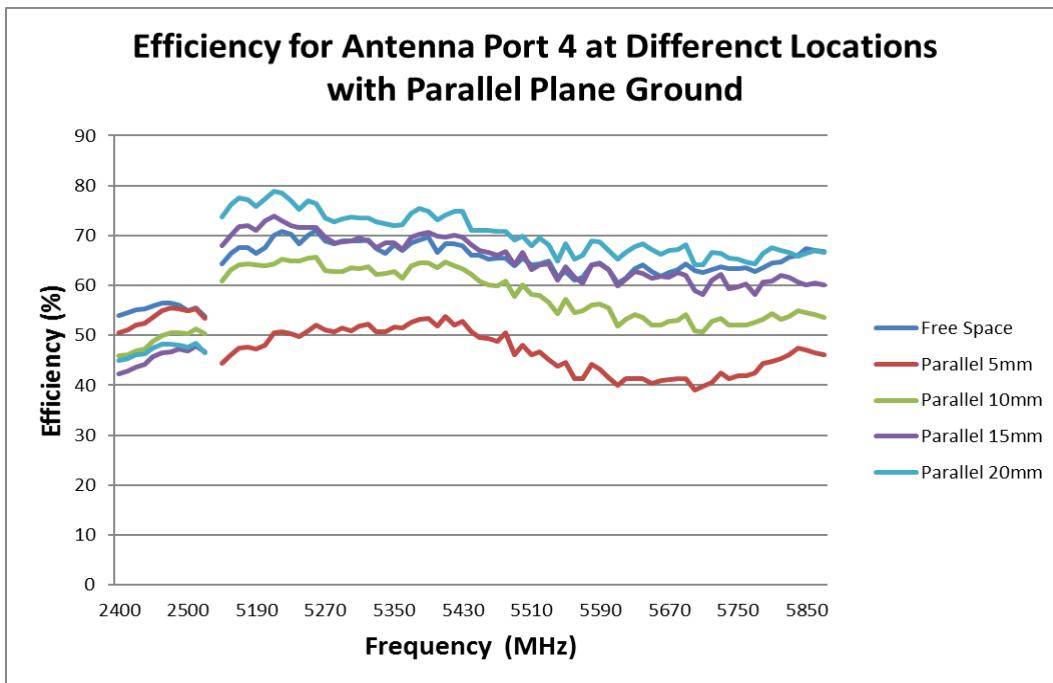


FIGURE 6.1.8 EFFICIENCY OF ANTENNA PORT 4 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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6.2 ANTENNA RF PERFORMANCE AS A FUNCTION OF DIFFERENT LOCATIONS WITH VERTICAL PLANE GROUND

Four locations with vertical plane ground have been evaluated and these locations are shown in figure 6.2.0. The plane ground size is 90mm*90mm and we move the plane ground to four locations for each test. The distance between antenna and vertical plane ground affect the antenna performance slightly. We still suggest the minimum distance between antenna and plane ground is recommended to be 5mm.

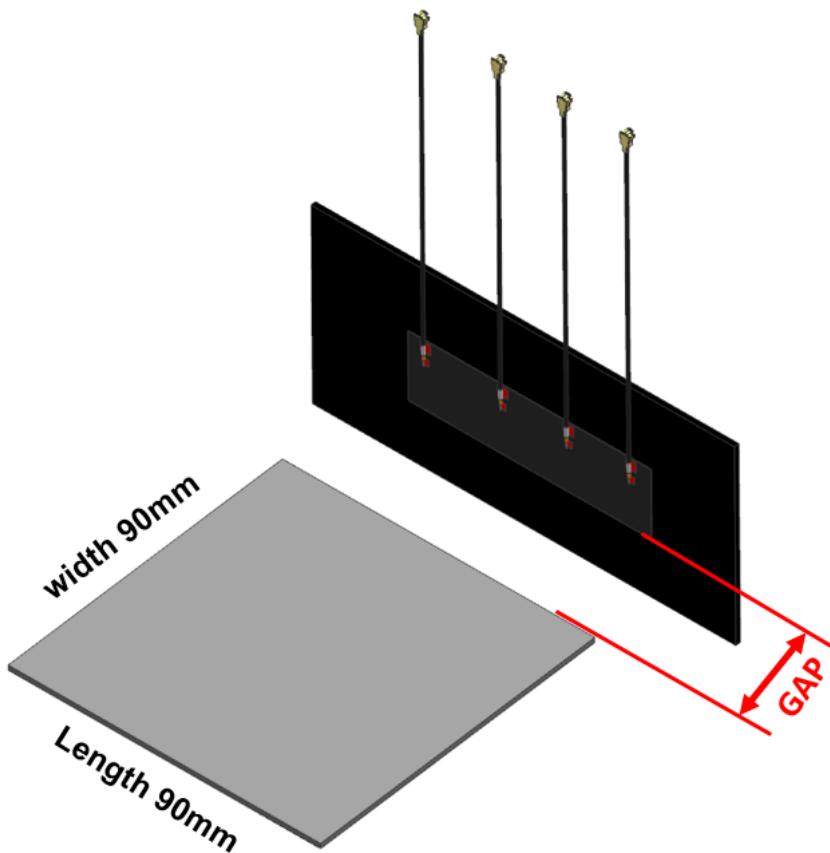


FIGURE 6.2.0 FOUR LOCATIONS WITH VERTICAL PLANE GROUND

Ground Size: 90mm*90mm;

Location 1: Distance between antenna and plane (GAP) ground is about 5mm;

Location 2: Distance between antenna and plane (GAP) ground is about 10mm;

Location 3: Distance between antenna and plane (GAP) ground is about 15mm;

Location 4: Distance between antenna and plane (GAP) ground is about 20mm.

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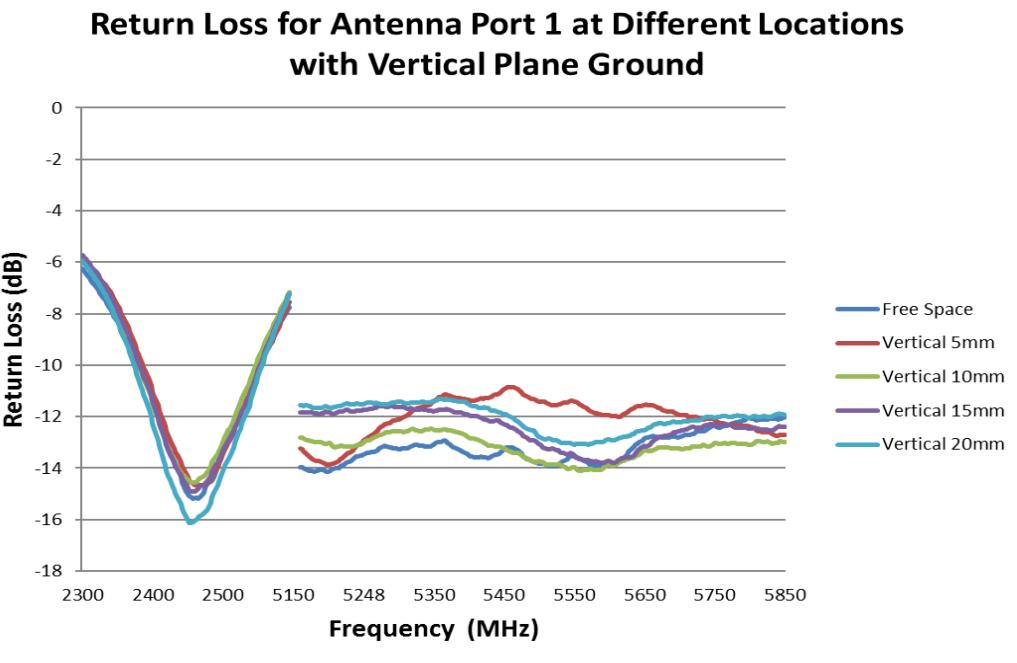


FIGURE 6.2.1 RETURN LOSS OF ANTENNA PORT 1 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

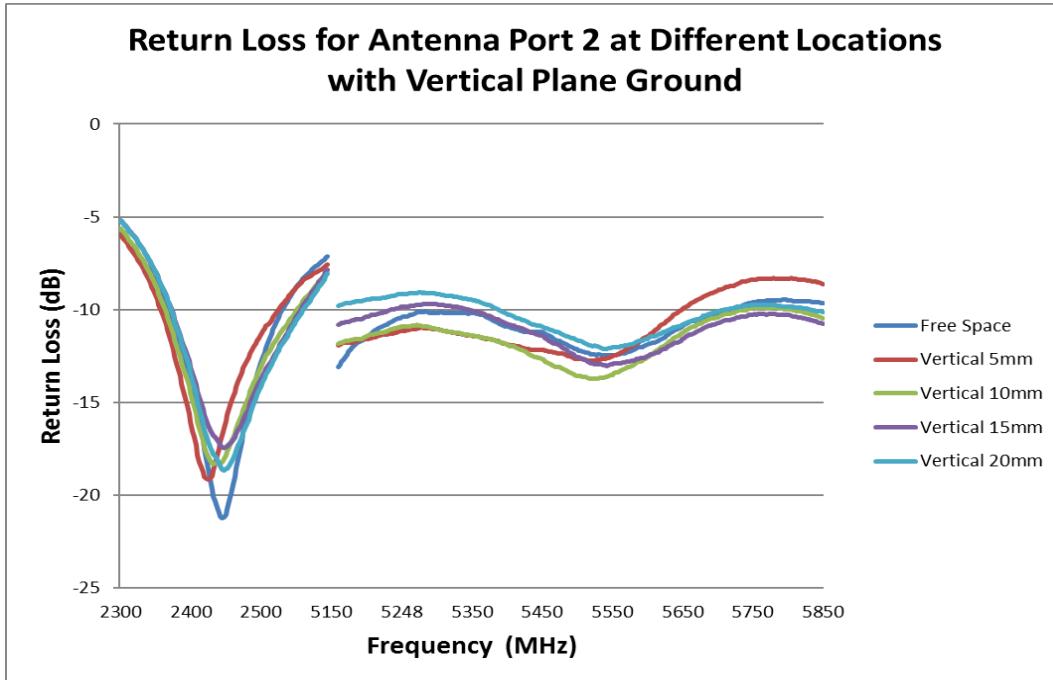


FIGURE 6.2.2 RETURN LOSS OF ANTENNA PORT 2 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

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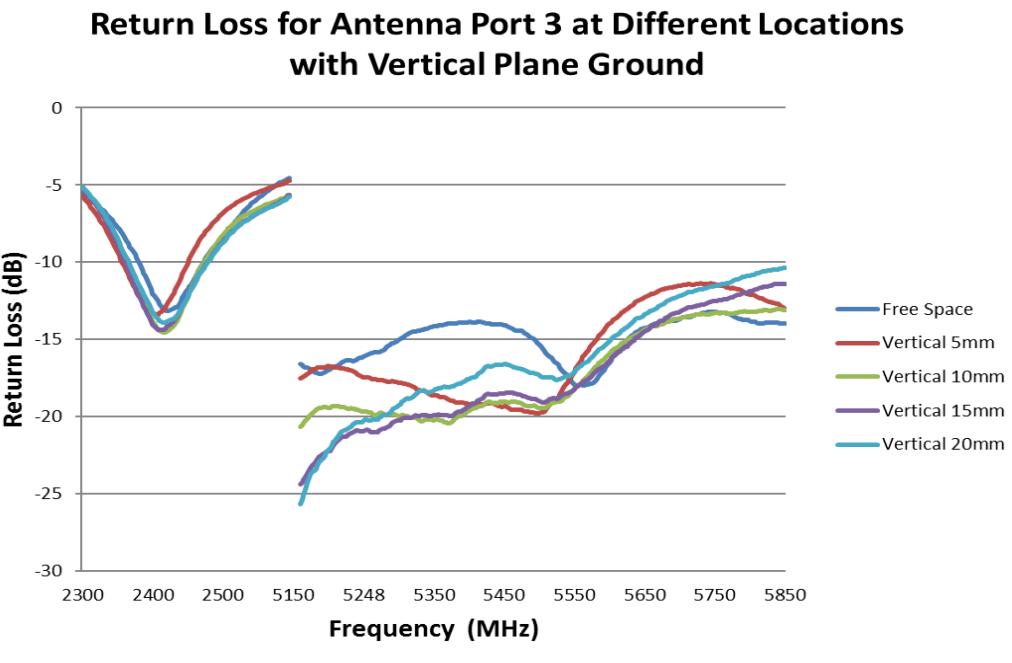


FIGURE 6.2.3 RETURN LOSS OF ANTENNA PORT 3 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

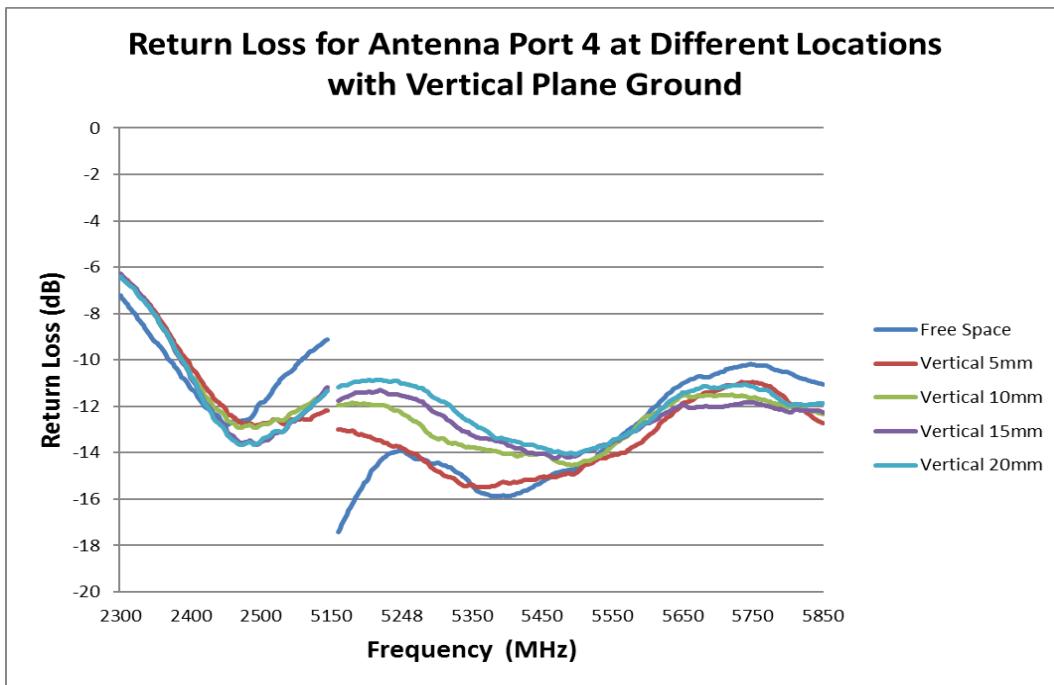


FIGURE 6.2.4 RETURN LOSS OF ANTENNA PORT 4 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

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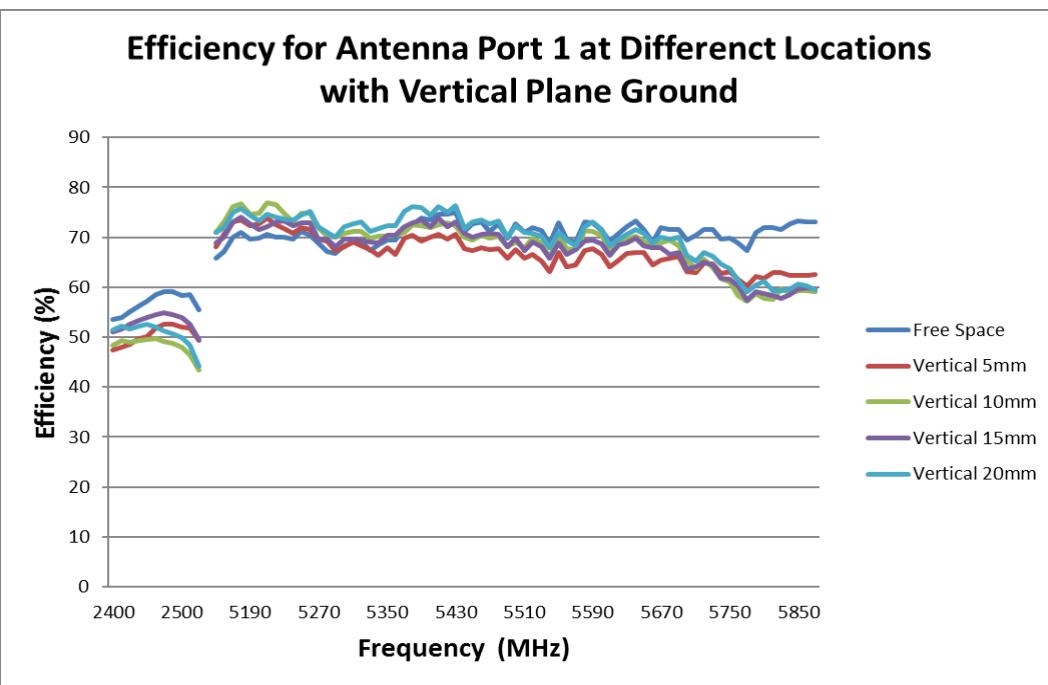


FIGURE 6.2.5 EFFICIENCY OF ANTENNA PORT 1 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

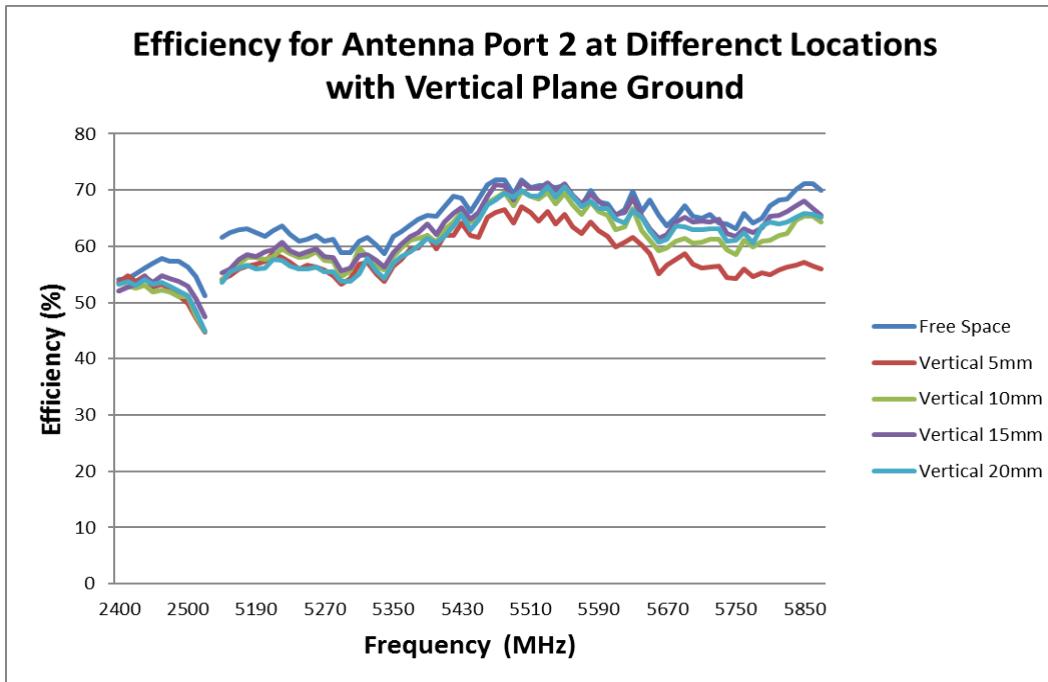


FIGURE 6.2.6 EFFICIENCY OF ANTENNA PORT 2 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

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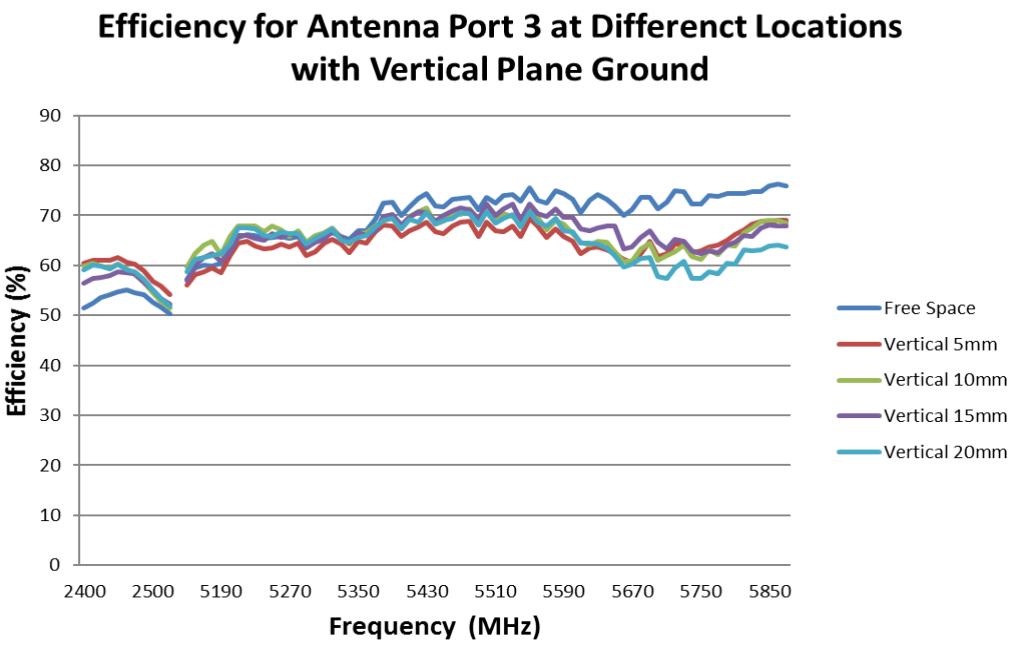


FIGURE 6.2.7 EFFICIENCY OF ANTENNA PORT 3 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

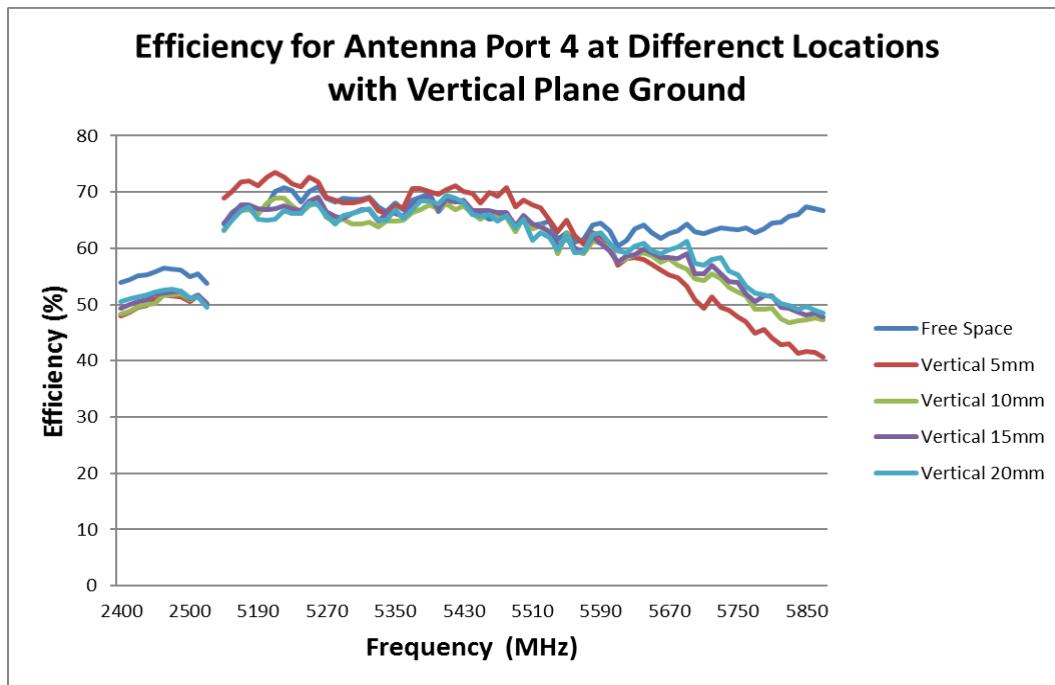


FIGURE 6.2.8 EFFICIENCY OF ANTENNA PORT 4 AT FOUR LOCATIONS WITH VERTICAL PLANE GROUND

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
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6.3 ANTENNA RF PERFORMANCE AS A FUNCTION OF DIFFERENT DISTANCES WITH PARALLEL PLANE GROUND

Four locations with the parallel plane ground have been evaluated and these locations are shown in figure 6.3.0. The plane ground size is 90mm*90mm and we move the plane ground to four locations for each test. The distance between the antenna and the parallel plane ground affect the antenna performance slightly. We still suggest the minimum distance between the antenna and the plane ground is recommended to be 5mm.

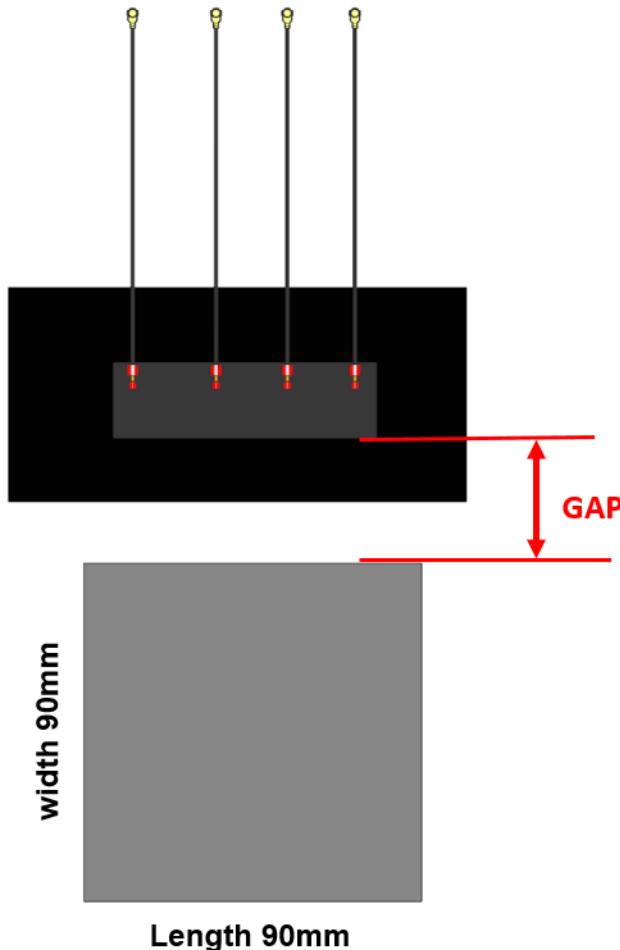


FIGURE 6.3.0 FOUR LOCATIONS WITH PARALLEL PLANE GROUND

Ground Size: 90mm*90mm;

Location 1: Distance between antenna and plane (GAP) ground is about 5mm;

Location 2: Distance between antenna and plane (GAP) ground is about 10mm;

Location 3: Distance between antenna and plane (GAP) ground is about 15mm;

Location 4: Distance between antenna and plane (GAP) ground is about 20mm.

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DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
AS-2123300100	<u>Liu Hai</u> 2020/07/07	<u>Kang Cheng</u> 2020/07/07	<u>Andy Zhang</u> 2020/07/07

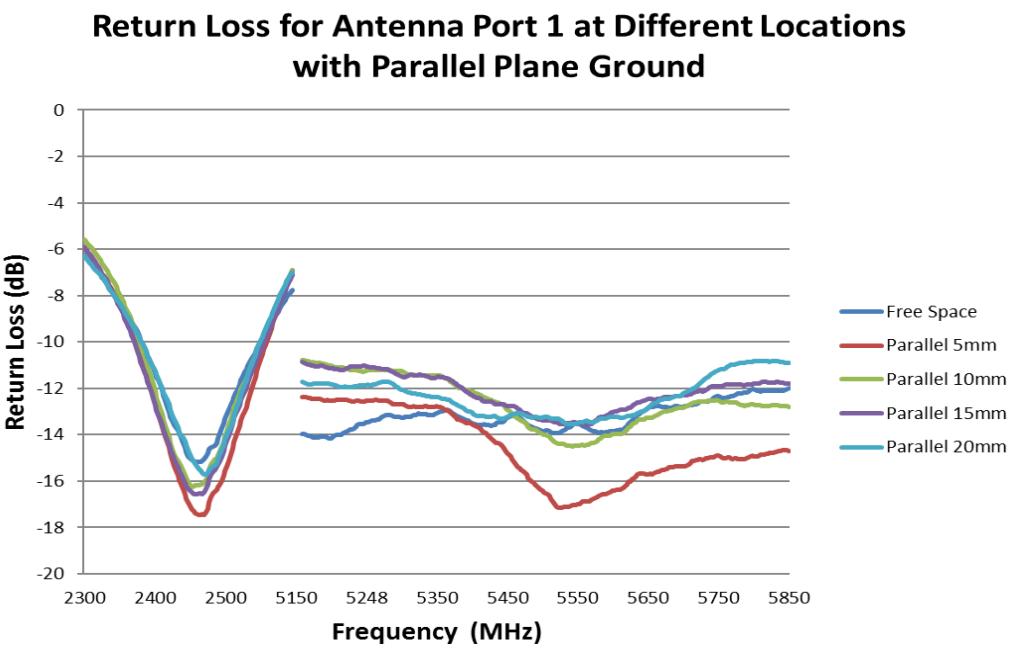


FIGURE 6.3.1 RETURN LOSS OF ANTENNA PORT 1 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

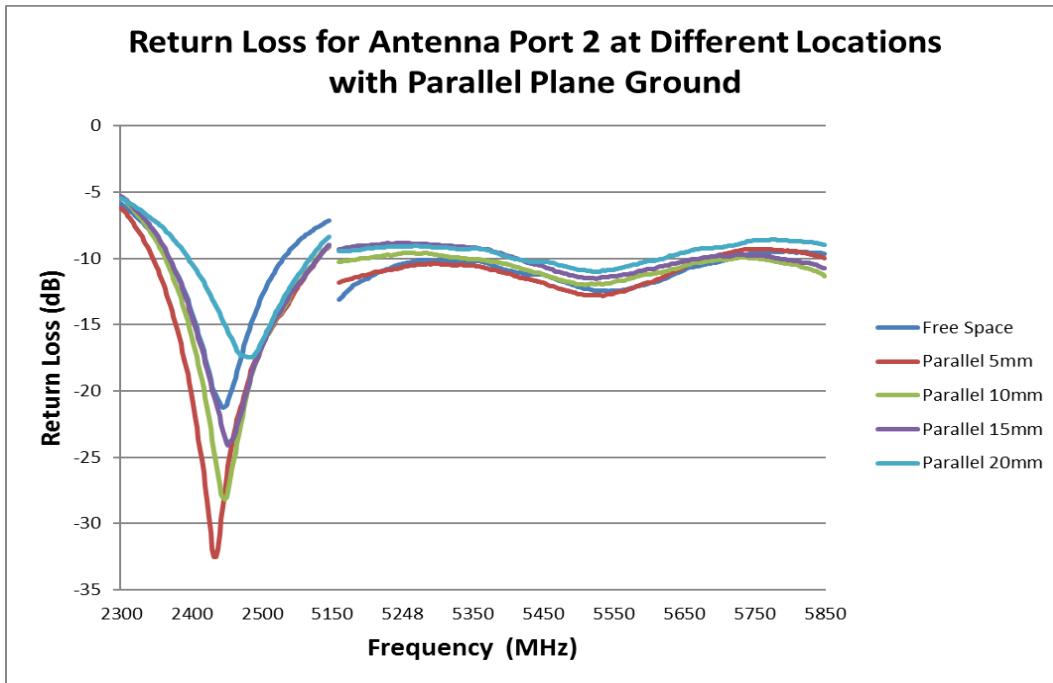


FIGURE 6.3.2 RETURN LOSS OF ANTENNA PORT 2 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

REVISION: B	ECR/ECN INFORMATION: EC No: 642299 DATE: 2020/07/15	TITLE: WiFi 6E Flex Cabled 4x4 MIMO Antenna Application Specification	SHEET No. 56 of 65
DOCUMENT NUMBER: AS-2123300100	CREATED / REVISED BY: Liu Hai 2020/07/07	CHECKED BY: Kang Cheng 2020/07/07	APPROVED BY: Andy Zhang 2020/07/07

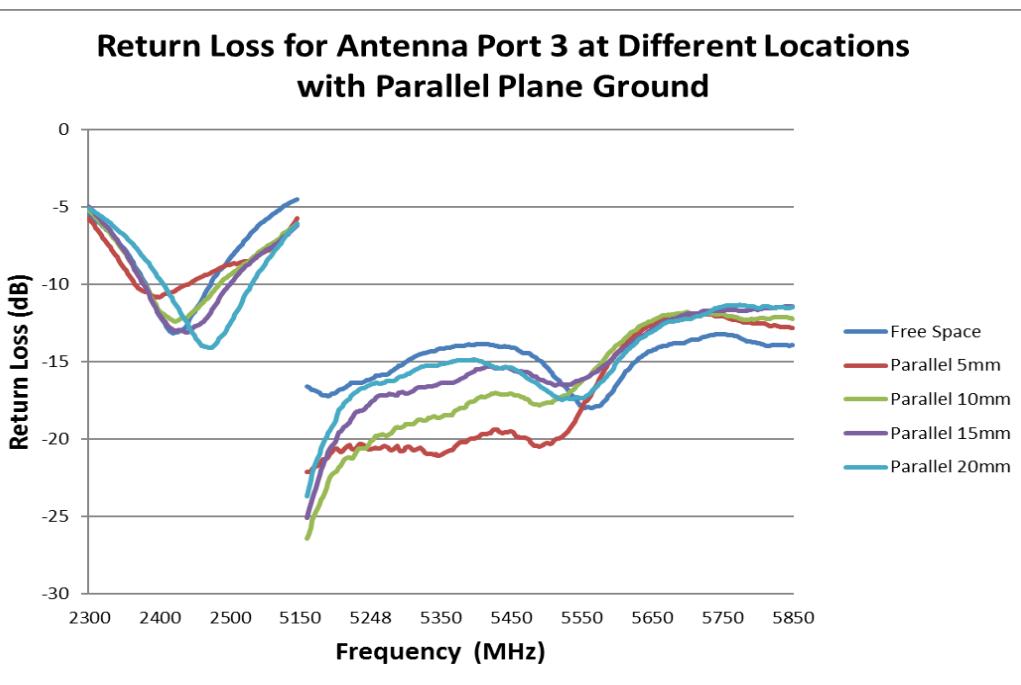


FIGURE 6.3.3 RETURN LOSS OF ANTENNA PORT 3 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

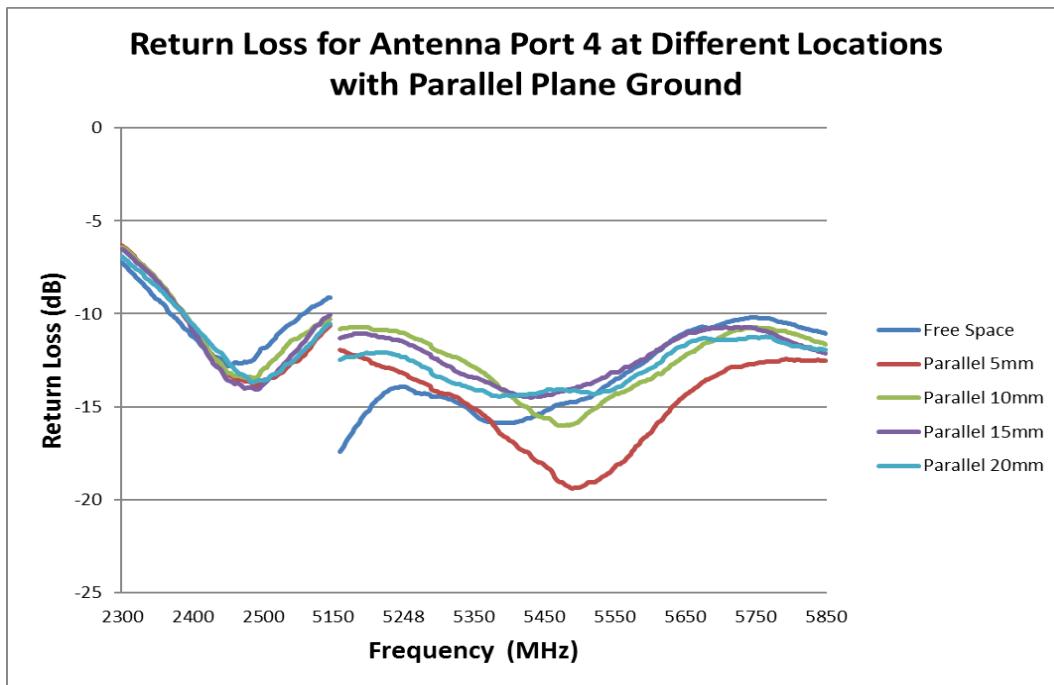


FIGURE 6.3.4 RETURN LOSS OF ANTENNA PORT 4 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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AS-2123300100	<u>Liu Hai</u> 2020/07/07	<u>Kang Cheng</u> 2020/07/07	<u>Andy Zhang</u> 2020/07/07

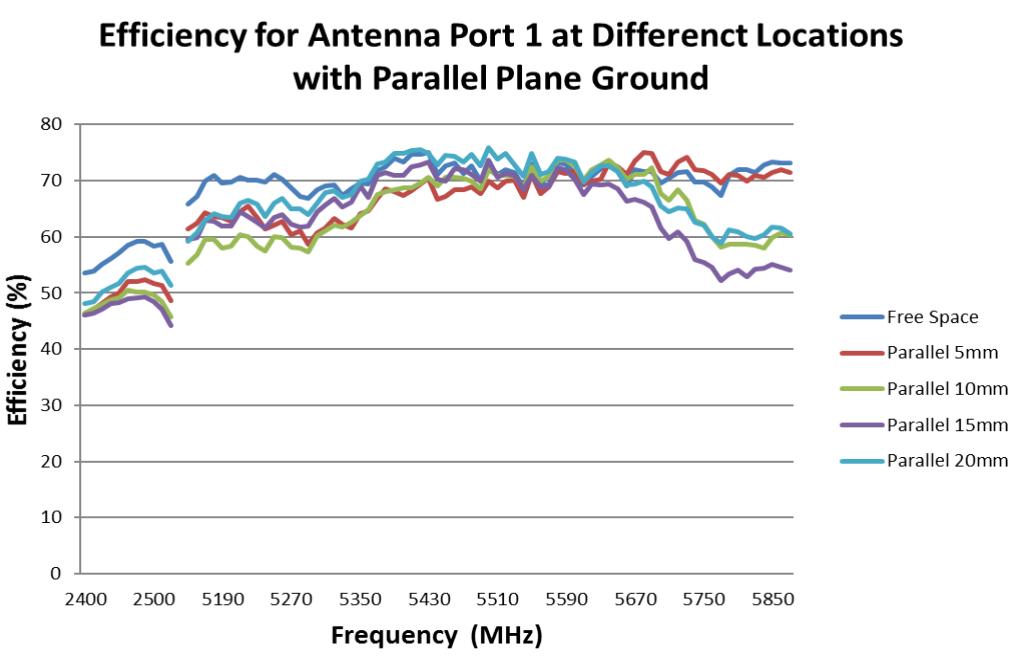


FIGURE 6.3.5 EFFICIENCY OF ANTENNA PORT 1 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

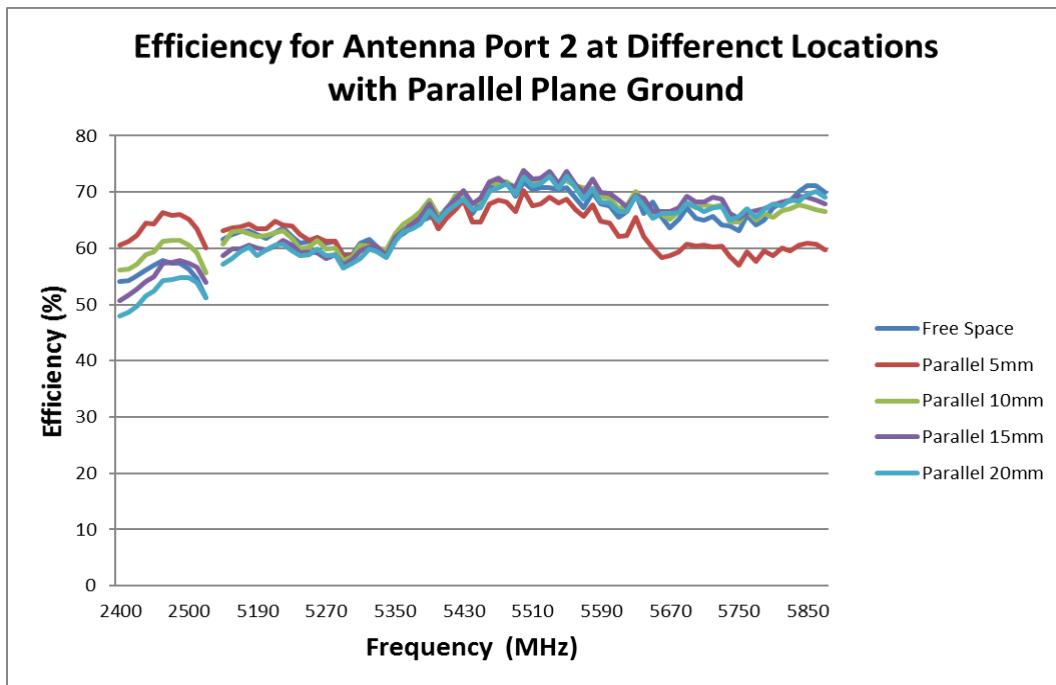


FIGURE 6.3.6 EFFICIENCY OF ANTENNA PORT 2 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

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AS-2123300100	Liu Hai 2020/07/07	Kang Cheng 2020/07/07	Andy Zhang 2020/07/07

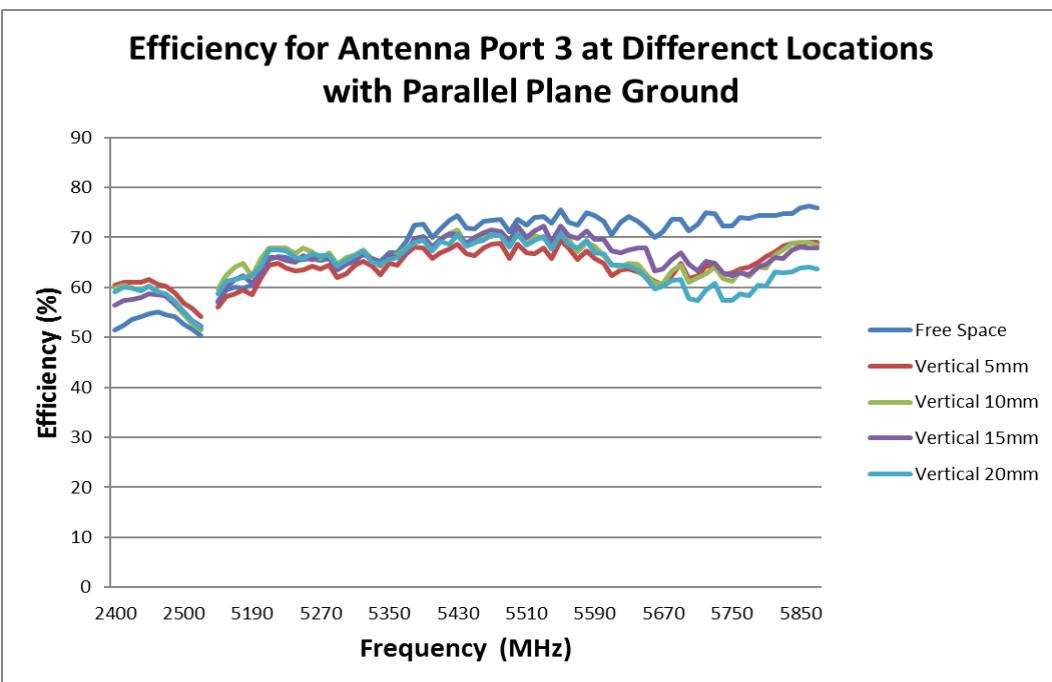


FIGURE 6.3.7 EFFICIENCY OF ANTENNA PORT 3 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

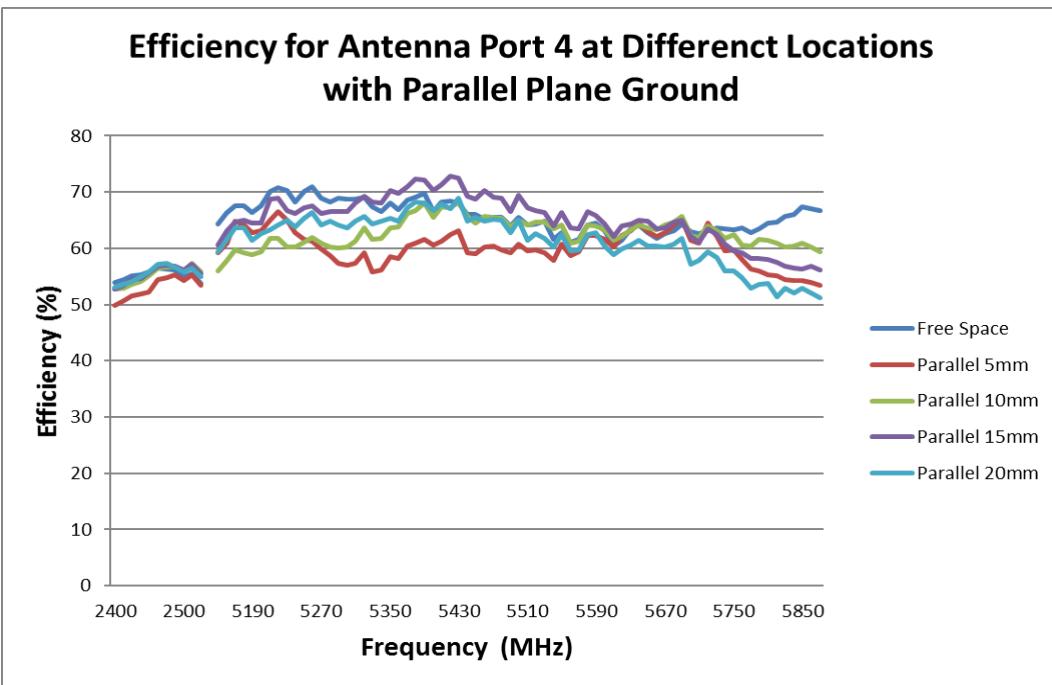


FIGURE 6.3.8 EFFICIENCY OF ANTENNA PORT 4 AT FOUR LOCATIONS WITH PARALLEL PLANE GROUND

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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6.4 ANTENNA RF PERFORMANCE WITH DIFFERENT CABLE LENGTH

Six cable length have been evaluated and these states are shown in figure 6.4.0.

The cable length is 50mm, 100mm (reference metal), 150mm, 200mm, 250mm and 300mm. The antenna performance with different cable length are shown in figure 6.4.1~6.4.8.

When the length of cable is greater than 200 mm or less than 50 mm, the performance of low frequency will decrease obviously. We suggest the cable length is 100mm, 150mm and 200mm.

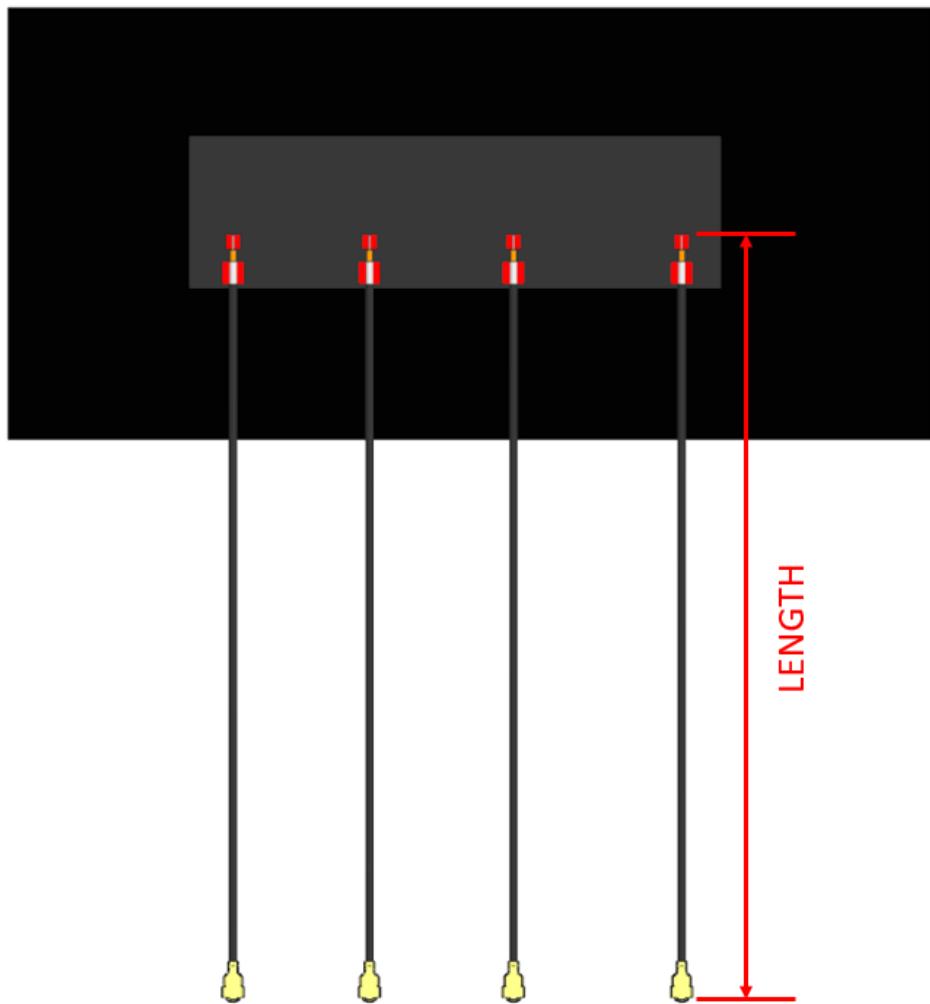


FIGURE 6.4.0 DIFFERENT CABLE LENGTH

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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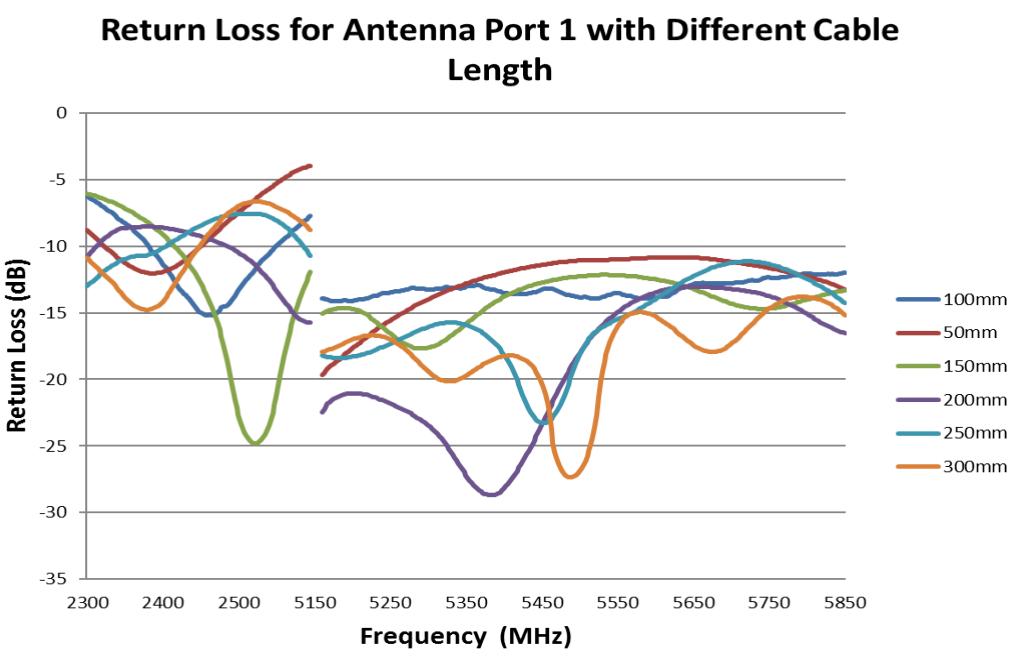


FIGURE 6.4.1 RETURN LOSS OF ANTENNA PORT 1 WITH DIFFERENT CABLE LENGTH

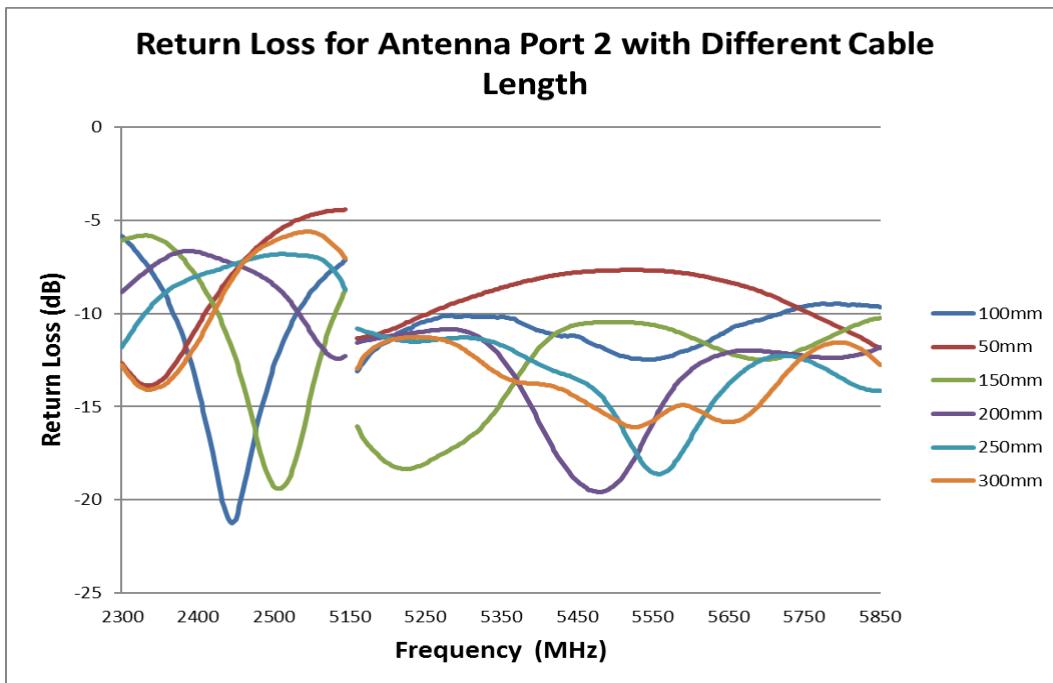


FIGURE 6.4.2 RETURN LOSS OF ANTENNA PORT 2 WITH DIFFERENT CABLE LENGTH

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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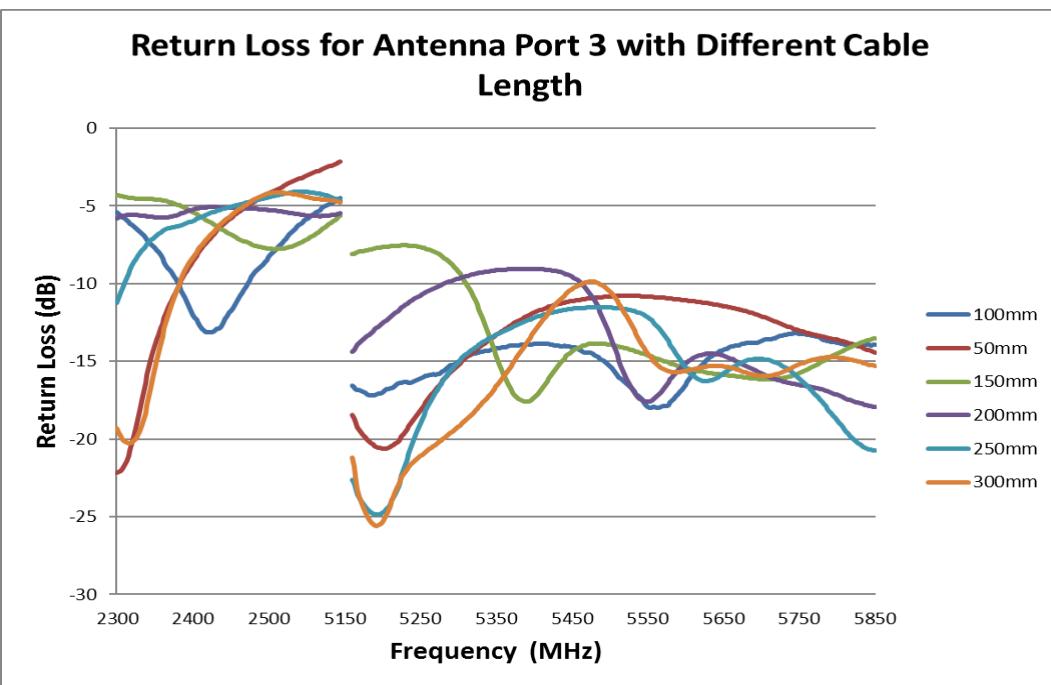


FIGURE 6.4.3 RETURN LOSS OF ANTENNA PORT 3 WITH DIFFERENT CABLE LENGTH

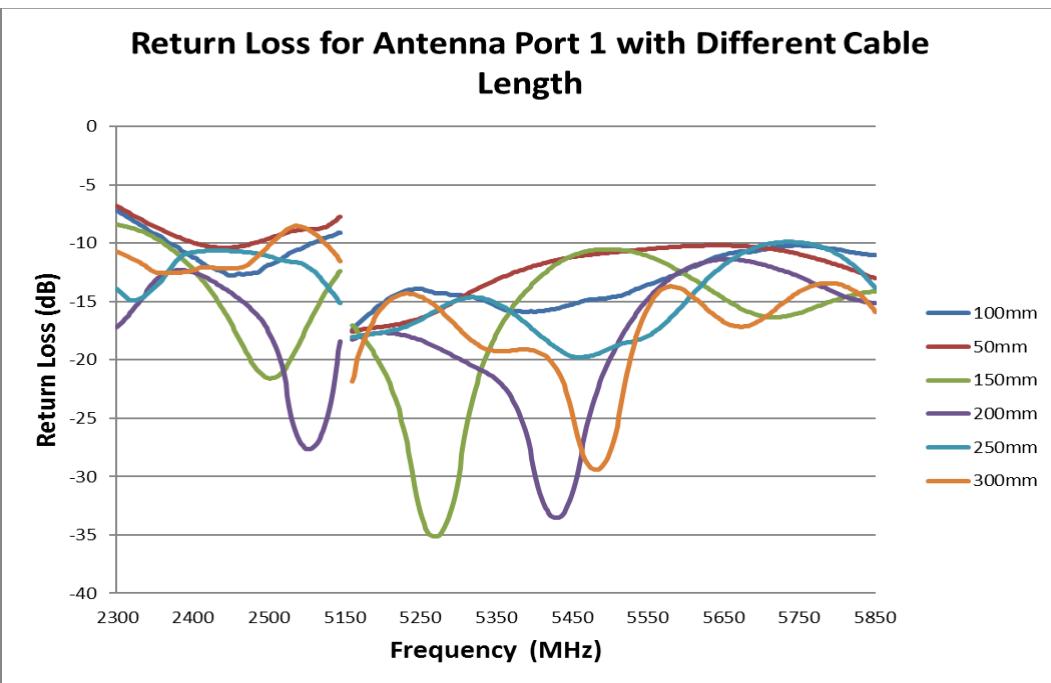


FIGURE 6.4.4 RETURN LOSS OF ANTENNA PORT 4 WITH DIFFERENT CABLE LENGTH

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
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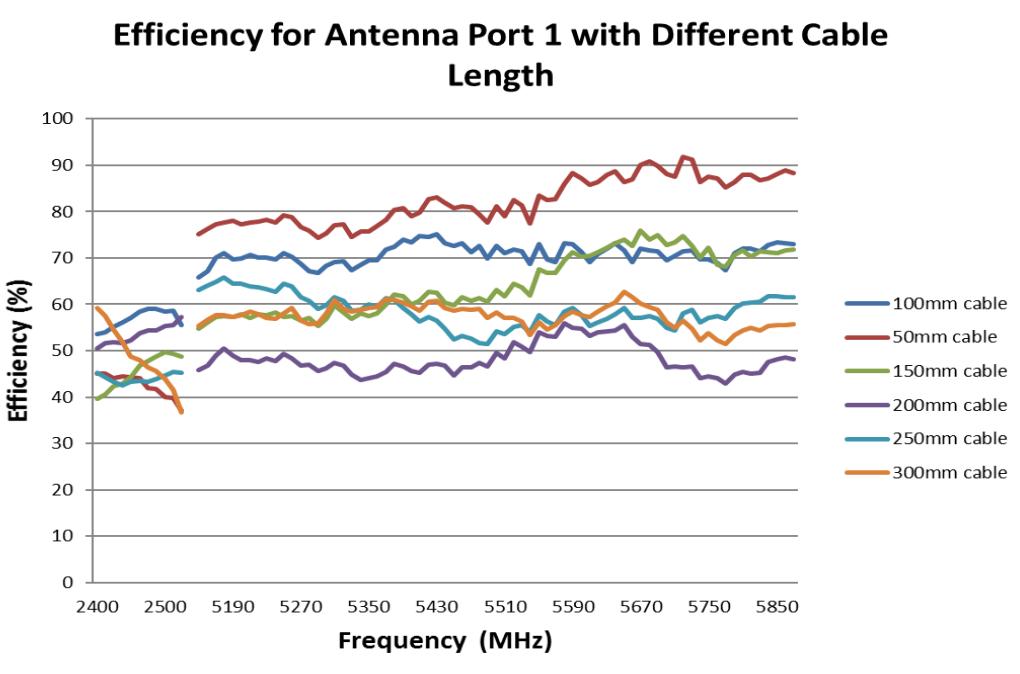


FIGURE 6.4.5 EFFICIENCY OF ANTENNA PORT 1 WITH DIFFERENT CABLE LENGTH

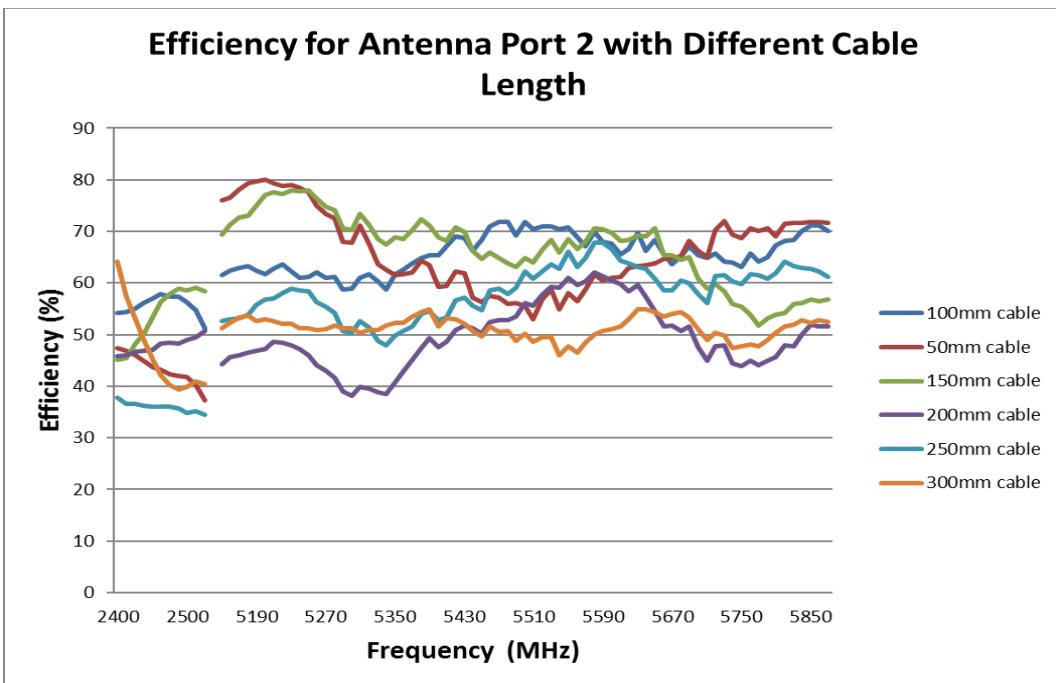


FIGURE 6.4.6 EFFICIENCY OF ANTENNA PORT 2 WITH DIFFERENT CABLE LENGTH

REVISION: B	ECR/ECN INFORMATION: <u>EC No: 642299</u> <u>DATE: 2020/07/15</u>	TITLE: WiFi 6E Flex Cabled 4x4 MIMO Antenna Application Specification	SHEET No. 63 of 65
DOCUMENT NUMBER: AS-2123300100	CREATED / REVISED BY: <u>Liu Hai 2020/07/07</u>	CHECKED BY: <u>Kang Cheng 2020/07/07</u>	APPROVED BY: <u>Andy Zhang 2020/07/07</u>

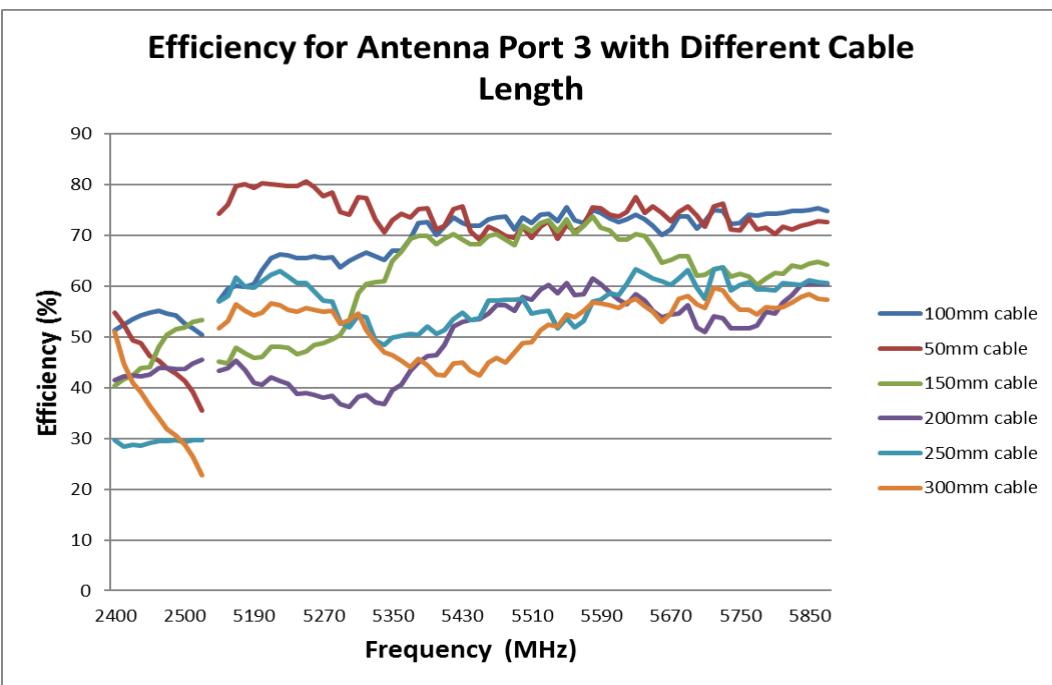


FIGURE 6.4.7 EFFICIENCY OF ANTENNA PORT 3 WITH DIFFERENT CABLE LENGTH

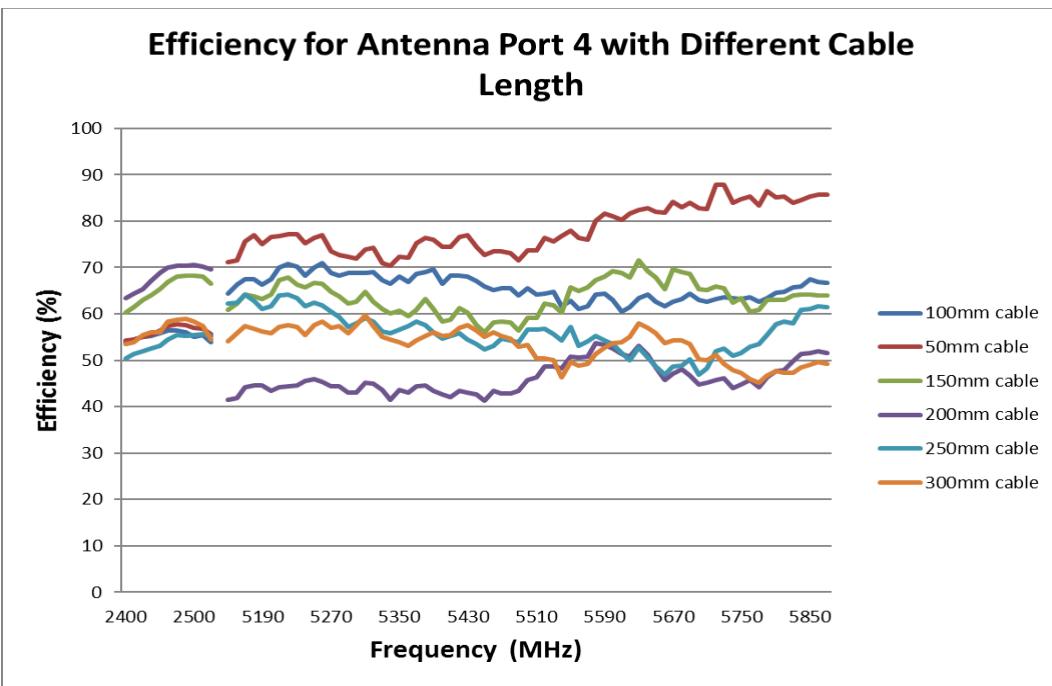
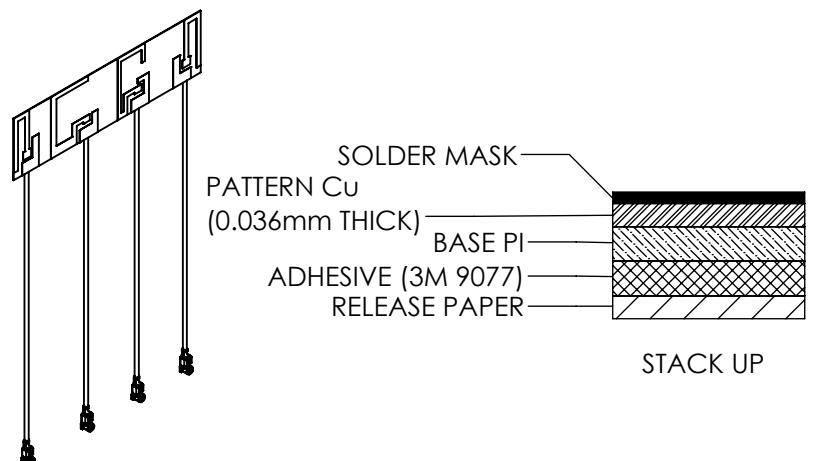
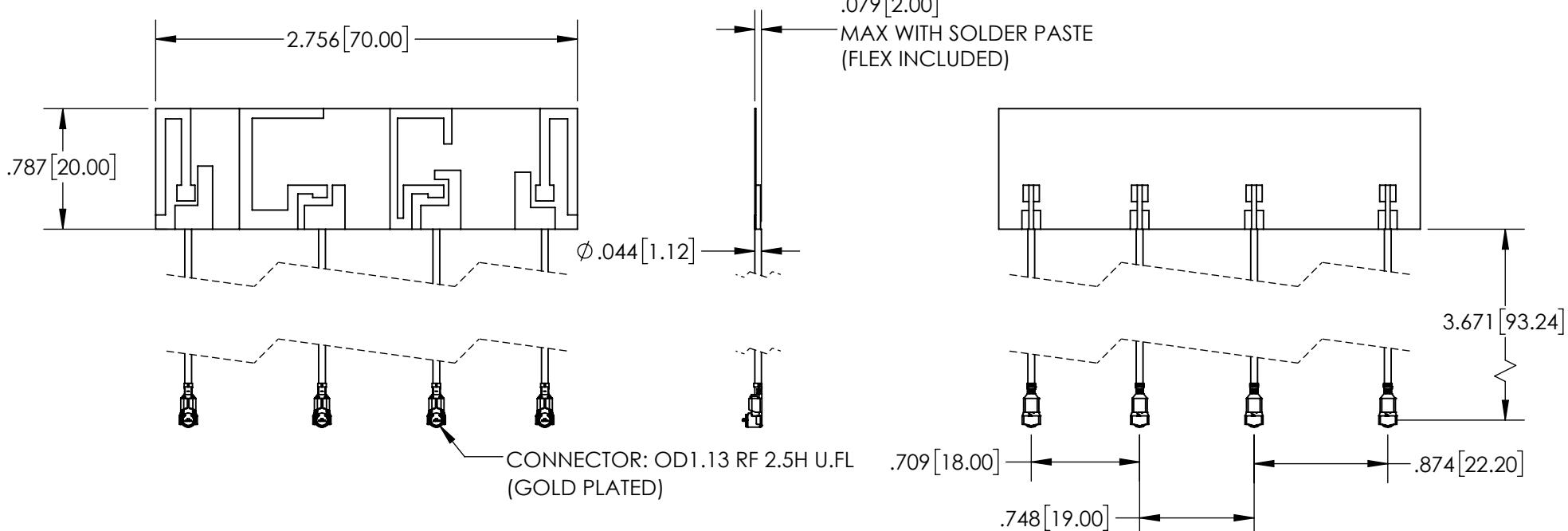


FIGURE 6.4.8 EFFICIENCY OF ANTENNA PORT 4 WITH DIFFERENT CABLE LENGTH

REVISION: B	ECR/ECN INFORMATION: <u>EC No: 642299</u> <u>DATE: 2020/07/15</u>	TITLE: WiFi 6E Flex Cabled 4x4 MIMO Antenna Application Specification	SHEET No. 64 of 65
DOCUMENT NUMBER: AS-2123300100	CREATED / REVISED BY: <u>Liu Hai 2020/07/07</u>	CHECKED BY: <u>Kang Cheng 2020/07/07</u>	APPROVED BY: <u>Andy Zhang 2020/07/07</u>



REVISIONS				
REV.	DESCRIPTION	DATE	CHANGED BY	APPROVED BY
1	INITIAL RELEASE	1/10/2024	J.JACK	K.CHAU



NOTES:

- 1) SOLDER MASK: BLACK
- 2) FOR PULL TEST, CAN NOT LIFT UP IN THE VERTICAL DIRECTION.
- 3) THE CONNECTOR WILL BE PROTECTED WITH A CAP

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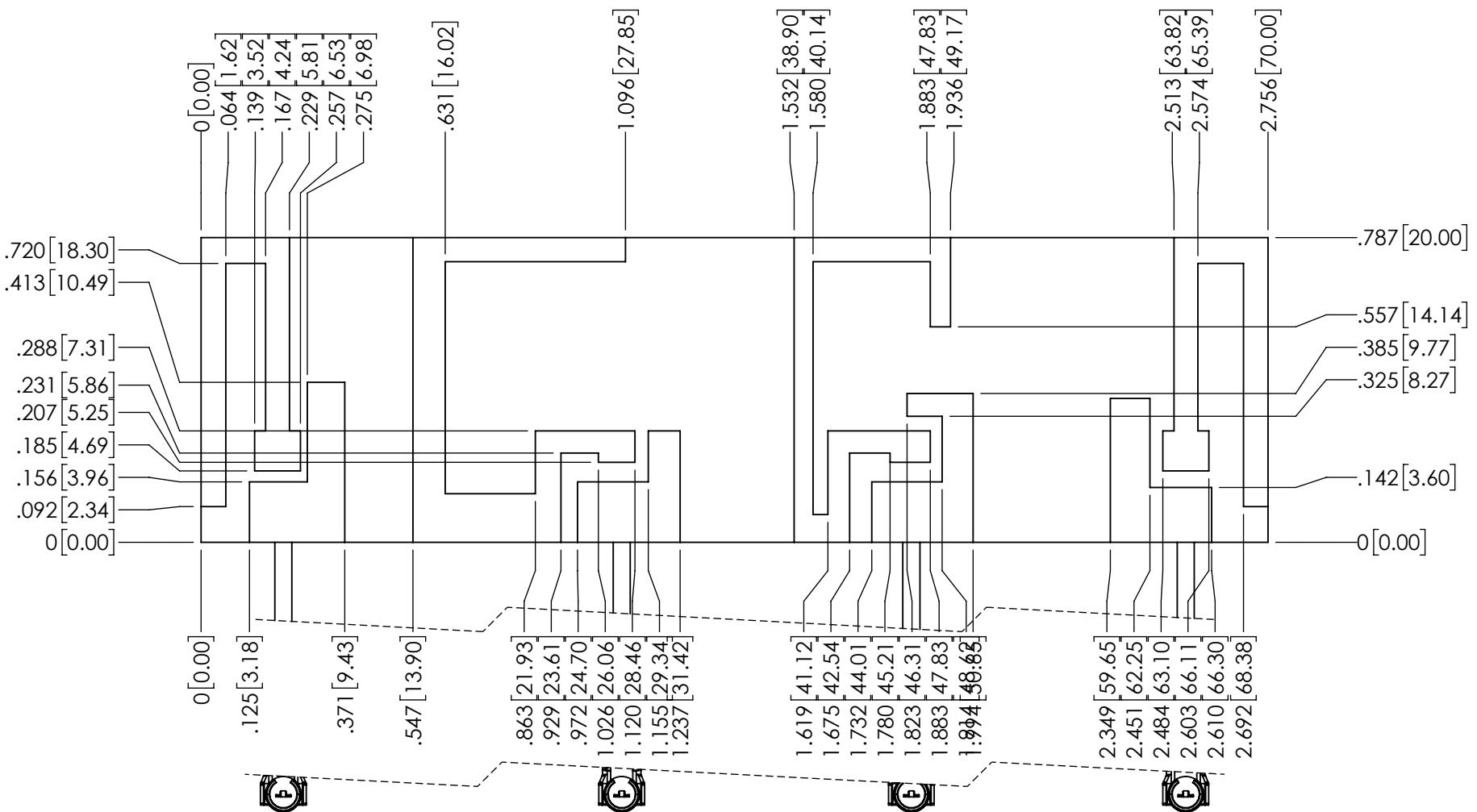
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TOLERANCES:
FRACTIONAL $\pm 1/32$
ANGULAR: MACH $\pm 0.5^\circ$ BEND $\pm 90^\circ$

X.XX ± 0.01 [0.3]
X.XXX ± 0.005 [0.13]
X.XXXX ± 0.0005 [0.013]
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FINISH	DESCRIPTION	REV
	2.4/5GHZ MIMO 4X4 FLEXIBLE ANTENNA	1
	PART NUMBER	
	212330-9100	
	DO NOT SCALE DRAWING	
	A	SCALE: 1:1
		SHEET 1 OF 2



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ANGULAR: MACH $\pm 0.5^\circ$ BEND $\pm 90^\circ$

X.XX $\pm 0.01[0.3]$
X.XXX $\pm 0.005[0.13]$
X.XXXX $\pm 0.0005[0.013]$
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MATERIAL
NA

FINISH
NA

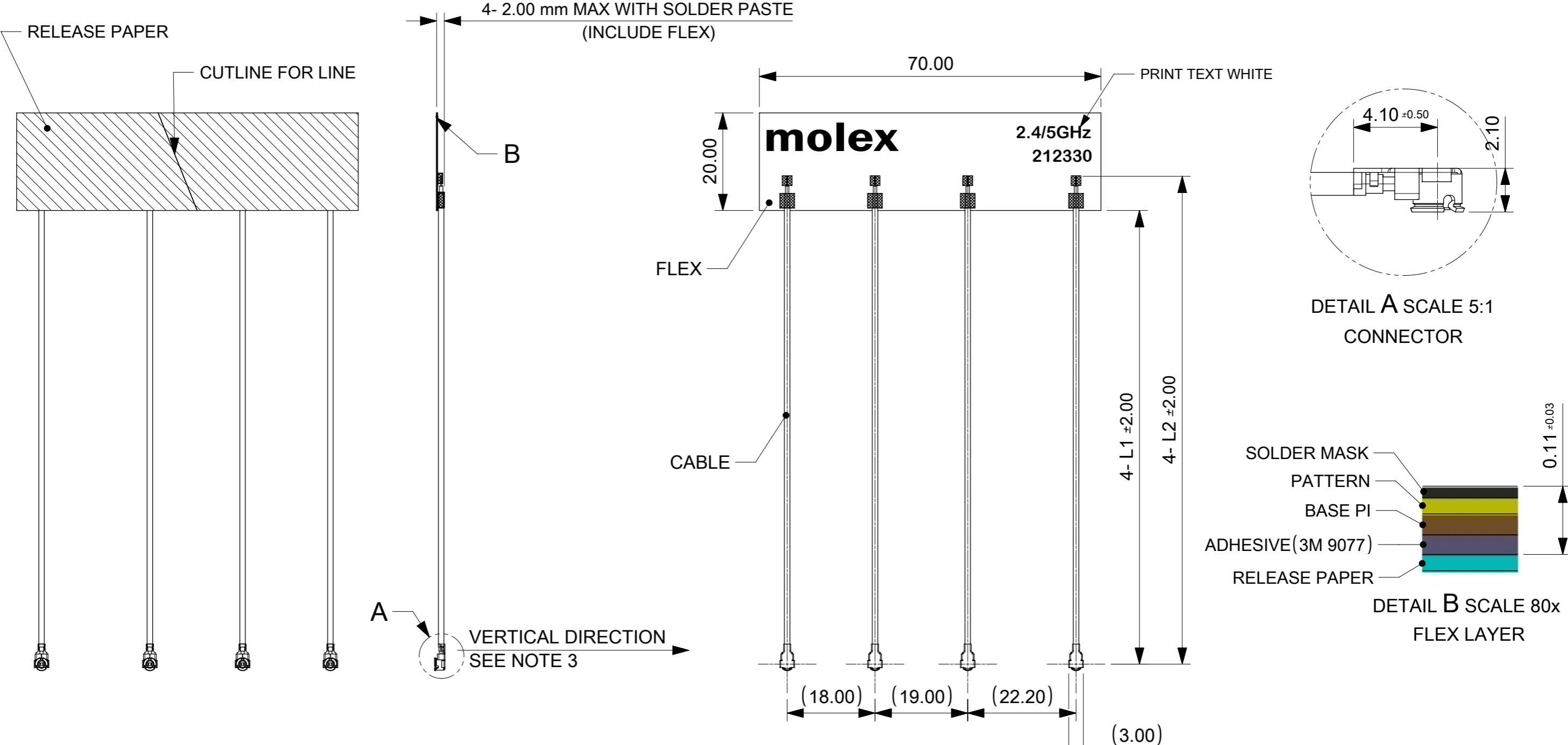
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DESCRIPTION
2.4/5GHZ MIMO 4X4 FLEXIBLE
ANTENNA

PART NUMBER
212330-9100

REV
1

A SCALE: 5:2 SHEET 2 OF 2



ITEM	MATERIAL NO.	CABLE LENGTH "L1"	CABLE LENGTH "L2"
1	2123300100	93mm	100mm
2	2123300150	143mm	150mm
3	2123300200	193mm	200mm

NOTES:

1. MATERIAL: FLEX 70*20mm
CABLE: Ø1.13 mm
CONNECTOR: COMPATIBLE U.FL & I-PEX MHF I. (PLUG GOLD PLATED)
2. SOLDER MASK: BLACK.
3. FOR PULL TEST, CAN NOT LIFT UP IN THE VERTICAL DIRECTION.
4. THE CONNECTOR WILL BE PROTECTED WITH A CAP.

SYMBOLS	THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX ELECTRONIC TECHNOLOGIES, LLC AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION			molex
	DIMENSION UNITS	SCALE	CURRENT REV DESC:	
▽ = 0	mm	1:1		
▽ = 0			EC NO: 622435	
▽ = 0			DRWN: KCHEUNG06	2019/08/13
▽ = 0			CHK'D: XJSONG	2019/08/15
▽ = 0			APPR: XJSONG	2019/08/15
▽ = 0			INITIAL REVISION:	
▽ = 0			DRWN: KCHEUNG06	2019/08/13
▽ = 0			APPR: XJSONG	2019/08/15
▽ = 0			DRAFT WHERE APPLICABLE MUST REMAIN WITHIN DIMENSIONS	
▽ = 0			THIRD ANGLE PROJECTION	
▽ = 0			DRAWING	
▽ = 0			SERIES	
▽ = 0			212330	
▽ = 0			SEE TABLE	
▽ = 0			CUSTOMER	
▽ = 0			GENERAL MARKET	
▽ = 0			1 OF 1	



APPLICATION SPECIFICATION

7.0 CHANGE HISTORY

REV	DATA	DESCRIPTION
A	2019/08/13	First Release
B	2020/07/07	Update 2D/3D radiation pattern and add 6-7.125GHz band

<u>REVISION:</u> B	<u>ECR/ECN INFORMATION:</u> <u>EC No:</u> 642299 <u>DATE:</u> 2020/07/15	<u>TITLE:</u> WiFi 6E Flex Cabled 4x4 MIMO Antenna Application Specification	<u>SHEET No.</u> 65 of 65
<u>DOCUMENT NUMBER:</u> AS-2123300100	<u>CREATED / REVISED BY:</u> Liu Hai 2020/07/07	<u>CHECKED BY:</u> Kang Cheng 2020/07/07	<u>APPROVED BY:</u> Andy Zhang 2020/07/07